LISTING OF CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A method of transmitting data comprising:
- providing a datastream comprised of bits;
- interleaving the bits of the datastream across a plurality of orthogonal frequency division multiplexed radio frequency transmitters, wherein each of the radio frequency transmitters transmits a plurality of radio frequency subcarriers, to provide interleaved bits wherein adjacent datastream bits are assigned to differing transmitters and differing subcarriers with low channel response correlation to thereby exploit an increased amount of spatial and frequency diversity;
- transmitting data that corresponds to the interleaved bits using the plurality of radio frequency subcarriers of the plurality of orthogonal frequency division multiplexed radio frequency transmitters.

2. (Original) The method of claim 1 wherein providing a datastream comprised of bits includes providing a datastream comprised of bits as provided from a single source.

3. (Original) The method of claim 1 wherein providing a datastream comprised of bits includes providing a datastream comprised of bits as provided from a plurality of sources.

4. (Original) The method of claim 3 wherein providing a datastream comprised of bits as provided from a plurality of sources includes providing a datastream comprised of bits as provided from a plurality of sources wherein at least some of the bits as provided from at least one of the plurality of sources are encoded bits.

5. (Original) The method of claim 1 wherein providing a datastream comprised of bits includes providing a datastream comprised of encoded bits.

6. (Original) The method of claim 5 wherein providing a datastream comprised of encoded bits includes providing a datastream comprised of convolutionally encoded bits.

7. (Original) The method of claim 5 wherein providing a datastream comprised of encoded bits includes providing a datastream comprised of serially concatenated convolutionally encoded bits.

8. (Original) The method of claim 5 wherein providing a datastream comprised of encoded bits includes providing a datastream comprised of parallel concatenated convolutionally encoded bits.

9. (Cancelled)

10. (Cancelled)

11. (Previously Presented) The method of claim 1 wherein assigning adjacent datastream bits to differing transmitters and differing subcarriers with low channel response correlation further comprises assigning adjacent datastream bits out of each encoder when multiple encoders are used to differing transmitters and different subcarriers with low channel response correlation to thereby exploit an increased amount of spatial and frequency diversity for each encoded datastream.

12. — 18. (Cancelled)

19. (Previously Presented) A method of receiving data comprising:

- using at least one orthogonal frequency division multiplexed transmission receiver having at least one antenna to receive multi-antenna transmission signals across a plurality of subcarriers ;
- demodulating the received multi-antenna transmission signals to recover data bits from bit metrics computed by using a maximum likelihood bit soft information estimator represented by

$$P(\mathbf{y}_k \mid b_{i,k}) = \sum_{\mathbf{s} \in S_i} P(\mathbf{y}_k \mid \mathbf{s}_k = \mathbf{s}) P(\mathbf{s}_k = \mathbf{s})$$

where $P(\mathbf{y}_k \mid b_{i,k})$ is a probability of observing received signals $\mathbf{y}_k$ at the k^{th} subcarrier on at least one antenna under the condition of transmitting bit $b_{i,k}$ (0 or 1), and S_i is a set of all symbol vectors whose bit representations contain the given value of the bit of interest $b_{i,k}$.

20. (Cancelled)

21. (Cancelled)

22. (Previously Presented) A method of receiving data comprising:

- using at least one orthogonal frequency division multiplexed transmission receiver having at least one antenna to receive multi-antenna transmission signals across a plurality of subcarriers;
- demodulating the received multi-antenna transmission signals to recover data bits from bit metrics computed by using a zero forcing bit metric estimator represented by

$$P(\hat{s}_{j,k} \mid b_{i,k}) = \sum_{s_0 \in S_i} \exp\left[-\mid \hat{s}_{j,k} - s_0 \mid^2 /(2\|\mathbf{W}_k(:,j)\|^2 \sigma_n^2)\right] P(\hat{s}_{j,k} = s_0)$$

where $\hat{s}_{j,k}$ is the estimated symbol at the k^{th} subcarrier of the j^{th} transmitted antenna, i.e. $[\hat{s}_{1,k}, \ldots, \hat{s}_{MT,k}]^T = \mathbf{W}_k^H \boldsymbol{y}_k$, with the filter matrix $\mathbf{W}_k$ being the zero forcing matrix computed based on the channel matrix $\boldsymbol{H}_k$, and where $\mathbf{W}_k(:,j)$ denotes the j^{th} column of $\mathbf{W}_k$, "$\|.\|$" denotes the vector norm, σ_n^2 is the noise power, and S_i is a set of constellation symbols whose bit representations contain the given value of the bit of interest $b_{i,k}$.

23. (Previously Presented) A method of receiving data comprising:

- using at least one orthogonal frequency division multiplexed transmission receiver having at least one antenna to receive multi-antenna transmission signals across a plurality of subcarriers;
- demodulating the received multi-antenna transmission signals to recover data bits from bit metrics computed by using a minimum mean squared error bit metric estimator represented by

$$P(\hat{s}_{j,k} \mid b_{i,k}) = \sum_{s_0 \in S_i} \exp\left[-\mid \hat{s}_{j,k} - s_0 \mid^2 /(2\|\mathbf{W}_k(:,j)\|^2 \sigma_n^2 + 2\|\mathbf{H}_k^H \mathbf{W}_k(:,j) - \mathbf{e}_j\|^2 \sigma_s^2)\right] P(\hat{s}_{j,k} = s_0)$$

where $\hat{s}_{j,k}$ is the estimated symbol at the k^{th} subcarrier of the j^{th} transmitted antenna, i.e. $[\hat{s}_{1,k}, \ldots, \hat{s}_{MT,k}]^T = \mathbf{W}_k^H \boldsymbol{y}_k$, with the filter matrix $\mathbf{W}_k$ being the minimum mean squared error matrix computed based on the channel matrix $\boldsymbol{H}_k$ (scale each row of $\mathbf{W}_k^H$ so that the diagonal elements of $\mathbf{W}_k^H\mathbf{H}_k$ equal 1), and where $\mathbf{W}_k(:,j)$ denotes the j^{th} column of $\mathbf{W}_k$, "$\|.\|$" denotes the vector norm, σ_n^2 denotes the noise power, $\boldsymbol{e}_j$ is a vector whose only nonzero entry 1 is at the j^{th} position, σ_s^2 is the average symbol power, and S_i is a set of contellation symbols whose bit representations contain the given value of the bit of interest $b_{i,k}$.

24. — 27. (Cancelled)

28. (Original) A method of receiving data comprising:
substantially simultaneously:
- using a first orthogonal frequency division multiplexed transmission receiver having at least one antenna to receive multi-antenna transmission signal across a plurality of subcarriers to obtain first modulation items;
- using a second orthogonal frequency division multiplexed transmission receiver having at least one antenna to receive multi-antenna transmission signal across a plurality of subcarriers to obtain second modulation items, wherein the plurality of subcarriers are substantially identical for both the first and second receiver;
- demodulating the radio frequency transmissions as received by the first and second receivers to recover a single stream of data comprised of bits that are recovered from both the first and second modulation items, wherein demodulation includes the use of a zero forcing symbol metric estimator based on ("ln" stands for the natural logarithm)

$$\ln P(\hat{s}_{j,k} \mid s_0) = -\mid \hat{s}_{j,k} - s_0 \mid^2 /(2\|\mathbf{W}_k(:,j)\|^2 \sigma_n^2)$$

where $\hat{s}_{j,k}$ is the estimated symbol at the k^{th} subcarrier of the j^{th} transmitted antenna, i.e. $[\hat{s}_{1,k}, ..., \hat{s}_{MT,k}]^T = \mathbf{W}_k^H \boldsymbol{y}_k$, with the filter matrix $\mathbf{W}_k$ being the zero forcing matrix computed based on the channel matrix $\boldsymbol{H}_k$, and where $\mathbf{W}_k(:,j)$ denotes the j^{th} column of $\mathbf{W}_k$, "$\|.\|$" denotes the vector norm, σ_n^2 is the noise power, and s_0 is any of the constellation symbols.

29. (Original) A method of receiving data comprising:
substantially simultaneously:
- using a first orthogonal frequency division multiplexed transmission receiver having at least one antenna to receive radio frequency transmissions across a plurality of subcarriers to obtain first modulation items;
- using a second orthogonal frequency division multiplexed transmission receiver having at least one antenna to receive radio frequency transmissions across a plurality of subcarriers to obtain second modulation items, wherein the plurality of subcarriers are substantially identical for both the first and second receiver;
- demodulating the radio frequency transmissions as received by the first and second receivers to recover a single stream of data comprised of bits that are recovered from both the first and second modulation items, wherein demodulation includes the use of a minimum mean squared error symbol metric estimator based on ("ln" stands for the natural logarithm)

$$\ln P(\hat{s}_{j,k} \mid s_0) = -\mid \hat{s}_{j,k} - s_0 \mid^2 /(2\|\mathbf{W}_k(:,j)\|^2 \sigma_n^2 + 2\|\mathbf{H}_k^H \mathbf{W}_k(:,j) - \mathbf{e}_j\|^2 \sigma_s^2)$$

where $\hat{s}_{j,k}$ is the estimated symbol at the k^{th} subcarrier of the j^{th} transmitted antenna, i.e. $[\hat{s}_{1,k}, ..., \hat{s}_{MT,k}]^T = \mathbf{W}_k^H \boldsymbol{y}_k$, with the filter matrix $\mathbf{W}_k$ being the minimum mean squared error matrix computed based on the channel matrix $\boldsymbol{H}_k$ (scale each row of $\mathbf{W}_k^H$ so that the diagonal elements of $\mathbf{W}_k^H \mathbf{H}_k$ equal 1), and where $\mathbf{W}_k(:,j)$ denotes the j^{th} column of $\mathbf{W}_k$, "$\|.\|$" denotes the vector norm, σ_n^2 denotes the noise power, $\boldsymbol{e}_j$ is a vector whose only nonzero entry 1 is at the j^{th} position, σ_s^2 is the average symbol power, and s_0 is any of the constellation symbols.